Plant Tissue Analysis for Determining Fertilizer Needs of Michigan Fruit Crops
Michigan State University Extension Service
Eric Hanson, and Jerome Hull, Department of Horticulture
Issued March 1986
2 pages

MSU Ag Facts ——— Extension Bulletin E-449 (Revised) March 1986

# Plant Tissue Analysis for Determining Fertilizer Needs of Michigan Fruit Crops

Revision by
Eric Hanson and Jerome Hull,
Department of Horticulture

The most accurate measure of the nutritional health of plants is the concentration of nutrients in plant tissue. Years of research have shown that the fertilizer needs of established tree fruit crops, grapes and blueberries are best determined by tissue analysis. The reliability of soil tests to manage the nutrition of these perennial crops has been limited.

Tissue analysis enables growers to identify nutrients approaching deficient levels before yields decline or symptoms appear, and to diagnose and correct deficiencies that already exist. It will also indicate fertilizer overuse.

The Horticulture Department of Michigan State University has offered a plant tissue analysis service to fruit growers since 1953.

Tissue samples sent to the Plant Analysis Service are analyzed for N, P, K, Ca, Mg, Cu, Fe, B, Mn and Zn. Growers may request a total analysis, an N analysis only, or all elements except N. Analysis results and fertilizer recommendations are reviewed by district Extension horticultural agents and returned to growers through county Cooperative Extension Service offices. The service includes tree fruits—apples, sweet and tart cherries, nectarines, peaches, pears and plums—blueberries and grapes. Strawberry or raspberry leaf samples may be submitted to diagnose nutritional problems, but soil tests are usually adequate for these crops.

## How to Take Leaf Samples

Obtain sample bags and questionnaires from county Extension offices or from the Plant Analysis Service, Horticulture Department, Michigan State University, East Lansing, MI 48824.

### Which Areas to Sample

Divide your orchard into uniform sampling areas and collect separate samples to represent each area. Do not combine samples from young and old blocks or from blocks on different soil types. **Sample different varieties or fruit crops separately.** If several varieties are interplanted, select one variety to represent the area. If many sampling areas are present, different blocks may be sampled during successive years on a two- to four-year cycle. If plant age, variety and soil type are the same, collect one sample to represent each 10 acres.

### Tree Fruits

- Collect about 100 entire leaves per sample during July in southern Michigan or late July-early August in northern Michigan.
- Collect fully expanded leaves from the middle of the current season's growth (Fig. 1). *Do not* sample spur leaves or leaves damaged by insects, diseases, wind or machinery. Remove leaves by pulling downward toward the base of the shoot so that the stem (petiole) remains on the leaf. If a strip of bark remains attached to the base of leaves, sample one to two weeks later when leaves are more mature.
- Collect leaves that can be reached from the ground from all sides of trees. Collect leaves from as many different trees in the sampling area as possible.
- Wash leaves before they wilt to remove spray residues and dust. Swirl the leaves for 10 to 15 seconds in a detergent solution, then rinse in tap water and blot dry.
- Place leaves in the paper sample bag and let them dry for one to two days at room temperature.

### *Blueberries*

- Collect 100 entire leaves between July 15 and Aug. 15.
- Select fully expanded leaves from the middle of the current season's growth (Fig. 2). Do not use leaves close to fruit clusters or on 1-year-old canes growing from the bases of bushes. Collect leaves from all sides of bushes throughout the sampling area.
- Wash and dry leaves as described for tree fruit samples.

### Grapes

Only the petiole (stem) of a grape leaf is used, not the entire leaf.





—Collect about 100 petioles between July 15 and Aug. 15.
—Select the most recently matured leaves near the center of the shoot. Undersides of mature leaves should be darker than those of younger leaves. Do not use leaves adjacent to fruit clusters.
—Cut the leaf off close to the shoot (Fig. 3), then remove the leaf blade (Fig. 4), keeping only the petiole (Fig. 5).
—Place the petioles in the paper sample bag, and dry them for several days at room temperature.

## How to Submit Samples

Fill in all information on the questionnaire and place it in each sample bag. This information is necessary for prompt handling and interpretation of sample results. Submit a check or money order made out to Michigan State University with your samples.

| Costs per sample: | |
|---|---|
| Total analysis | $17.50 |
| N only | 10.00 |
| Total minus N | 14.00 |

Sample bags are preaddressed and can be mailed separately, or several bags may be packaged and mailed together. Send to: Plant Analysis Service, Horticulture Dept., MSU, East Lansing, MI 48824. Samples taken to your county Extension office will also be delivered to the Horticulture Department.

## How Results are Reported

Samples are analyzed and results are entered into a computer. The computer generates a report that includes the concentrations of mineral elements in the tisssue, a balance chart describing how your results compare to optimum levels, and fertilizer recommendations based on your sample results. Results and recommendations for crops other than tree fruits, grapes and blueberries will be hand written.

Reports are forwarded to your district Extension horticultural agent, who examines the results. One copy is then sent to the grower and additional copies are retained by the district Extension horticultural agent and the appropriate county Extension office.



Issued in furtherance of Cooperative Extension work in agriculture and home economics, acts of May 8, and June 30, 1914, in cooperation with the U.S. Department of Agriculture. W.J. Moline, Director, Cooperative Extension Service, Michigan State University, E. Lansing, MI 48824.



0-16113

Revised 3:86-3M-LJ/UP, Price 25¢, Single copy free to Michigan residents

*File: 26.14*